

CLAIMS:

The current status of the claims is as follows:

1. (Original) In a highway crash cushion of the type comprising an array of diaphragms, a plurality of energy absorbing elements disposed between the diaphragms, and an array of fender panels extending alongside the diaphragms, the improvement comprising:

a single rail disposed under the crash cushion and anchored to a support surface;

a plurality of guides, each coupled to a respective one of the diaphragms and substantially centered with respect to the respective diaphragm;

said guides mounted on the rail to slide along the rail and to restrict movement of the respective diaphragms with respect to the rail in both lateral directions;

said rail substantially centered with respect to the diaphragms;

at least some of the diaphragms each coupled to a respective leg assembly extending beneath the respective diaphragm on both sides of the rail to support the diaphragm on a support surface.

2. (Original) The invention of claim 1 wherein the rail comprises a plurality of interconnected rail segments.

3. (Original) The invention of claim 1 wherein the rail comprises first and second flanges, and wherein the guides extend under the flanges to prevent excessive upward movement of the diaphragms with respect to the rail.

4. (Original) The invention of claim 1 further comprising:

a plurality of leg assemblies, each leg assembly comprising an upper portion mounted to a respective one of the diaphragms, a lower portion, two side portions, and a centerline extending between the side portions;

each said lower portion connected to two feet shaped to support the respective leg on a support surface;

said feet extending outwardly from the respective leg assembly, away from the centerline, such that the feet are separated from the respective centerline by a maximum distance D_F , the side portions are separated from the respective centerline by a maximum distance D_L , and the ratio D_F / D_L is greater than 1.1.

5. (Original) The invention of claim 4 wherein the ratio D_F / D_L is greater than 1.4.

6. (Original) The invention of claim 4 wherein the ratio D_F / D_L is greater than 1.8.

7. (Original) The invention of claim 1 further comprising:

a plurality of leg assemblies, each leg assembly comprising an upper portion mounted to a respective one of the diaphragms, a lower portion, two side portions, and a centerline extending between the side portions;

each said lower portion connected to two feet shaped to support the respective leg on a support surface;

said feet extending outwardly from the respective leg assembly, away from the centerline, such that the feet are separated from the respective centerline by a maximum distance D_F , the side portions are separated from the respective centerline by a maximum distance D_L , and the difference $D_F - D_L$ is greater than 4 cm.

8. (Original) The invention of claim 7 wherein the difference $D_F - D_L$ is greater than 8 cm.

9. (Original) The invention of claim 7 wherein the difference $D_F - D_L$ is greater than 12 cm.

10. (Original) The invention of 4 or 7 wherein each foot angles downwardly and outwardly from the respective leg assembly.

11. (Original) The invention of claim 4 or 7 wherein each foot comprises a side plate adjacent a lower portion of the respective foot, each side plate extending outwardly and downwardly from the respective foot to create a ramp extending transversely to the respective diaphragm.

12. (Original) The invention of claim 4 or 7 wherein each leg assembly comprises a respective one of the guides centered on the centerline, each said guide comprising a first pair of spaced plates facing the centerline on one side of the centerline and a second pair of spaced plates facing the centerline on the other side of the centerline.

13. (Original) The invention of claim 1 wherein each leg assembly extends on both sides of the rail such that the leg assembly extends laterally outwardly of all of the respective guide and laterally outwardly of all of the rail.

14. (Original) The invention of claim 1 wherein each leg assembly comprises two legs, each leg extending on a respective side of the rail such that the legs extend laterally farther from a centerline aligned with the rail than both the guides and the rail.

15. (Original) The invention of claim 1 wherein each leg assembly comprises two legs arranged such that all of the rail and the respective guide are disposed between the legs.

16. (Original) The invention of claim 1 wherein at least a forward portion of the crash cushion is freestanding.

17. (Original) In a highway crash cushion of the type comprising an array of diaphragms, a plurality of energy absorbing elements disposed between the diaphragms, and an array of fender panels extending alongside the diaphragms, the improvement comprising:

a single rail disposed under the crash cushion and anchored to a support surface;

a plurality of guides, each coupled to a respective one of the diaphragms and substantially centered with respect to the respective diaphragm;

said guides mounted on the rail to slide along the rail and to restrict movement of the respective diaphragms with respect to the rail in both lateral directions;

said rail substantially centered with respect to the diaphragms;

wherein the rail comprises a plurality of interconnected rail segments;

wherein each rail segment forms a central protrusion at one end and a central recess at the other end, and wherein the protrusion of one rail segment is received within the recess of an adjacent rail segment.

18. (Previously Presented) In a highway crash cushion of the type comprising an array of diaphragms and a plurality of energy absorbing elements disposed between the diaphragms the improvement comprising:

a single rail disposed under the crash cushion and anchored to a support surface;

a plurality of guides, each coupled to a respective one of the diaphragms and substantially centered with respect to the respective diaphragm;

the guides mounted on the rail to slide along the rail and to restrict movement of the respective diaphragms with respect to the rail in both lateral directions;

the rail substantially centered with respect to the diaphragms;

at least some of the diaphragms each coupled to a respective leg assembly extending beneath the respective diaphragm on both sides of the rail to support the diaphragm on the support surface.

19. (Previously Presented) In a highway crash cushion of the type comprising a diaphragm and at least one energy absorbing element disposed adjacent the diaphragm, the improvement comprising:

a support structure comprising a single rail assembly disposed under the crash cushion and comprising a first end and a second end, the support structure being anchored to a support surface between the first and second ends and being substantially centered with respect to the diaphragm,

a guide coupled to the diaphragm and substantially centered with respect to the diaphragm,

the guide mounted to slide along the support structure and to restrict movement of the diaphragm with respect to the support structure in at least one lateral direction,

the diaphragm coupled to a leg assembly extending beneath the diaphragm on both sides of the rail assembly to support the diaphragm on the support surface.

Claim 20. (Cancelled).

21. (Previously Presented) In a highway crash cushion of the type comprising a diaphragm and at least one energy absorbing element disposed adjacent the diaphragm, the improvement comprising:

a support structure comprising a single rail assembly disposed under crash cushion and anchored to a support surface, said single rail assembly substantially centered with respect to the diaphragm,

a guide coupled to the diaphragm and substantially centered with respect to the diaphragm,

the guide mounted to slide along the support structure and to restrict movement of the diaphragm with respect to the support structure in at least one lateral direction, the guide mounted to slide along the support structure without extending below a lower surface of the support structure,

the diaphragm coupled to a leg assembly extending beneath the diaphragm on both sides of said rail assembly to support the diaphragm on the support surface.

22. (Previously Presented) The invention of Claim 19 wherein the guide is mounted to slide along the support structure without extending below a lower surface of the support structure.

23. (Previously Presented) The invention of Claim 19 wherein the guide is mounted to slide along the support structure and to allow contact between a lower surface of the support structure and the support surface.

24. (Previously Presented) The invention of Claim 21 wherein the guide is mounted to slide along the support structure and to allow contact between the lower surface of the support structure and the support surface.

25. (Previously Presented) The invention of Claim 21 wherein the support structure comprises a first end and a second end and is anchored to the support surface between the first and second ends.

26. (Previously Presented) The invention of Claim 19 or 21 wherein the support structure is anchored to the support surface under the crash cushion.

27. (Previously Presented) The invention of Claim 19 or 21 wherein the support structure is anchored to the support surface under the diaphragm or the at least one energy absorbing element.

28. (Previously Presented) The invention of Claim 19 or 21 wherein the support structure is anchored to the support surface at a first location and wherein the diaphragm moves past the first location during collapse of the crash cushion.

Claim 29 (Cancelled).

30. (Previously Presented) The invention of Claim 19 or 21 wherein the support structure comprises a plurality of axially aligned, releasably interconnected support structure segments.

31. (Previously Presented) The invention of Claim 30 wherein at least one support structure segment forms a recess at one end, the recess adapted to receive a protrusion extending outwardly from an adjacent support structure segment.

32. (Previously Presented) The invention of Claim 31 wherein the protrusion extending outwardly from the adjacent support structure segment is formed in the adjacent support structure segment.

Claims 33-35 (Cancelled).

36. (Previously Presented) The invention of Claim 19 or 21 wherein the guide and the leg assembly provide resistance to overturning in the at least one lateral direction.

37. (Previously Presented) The invention of Claim 19 or 21 wherein the guide is mounted to restrict movement of the diaphragm with respect to the support structure in both lateral directions.

Claim 38 (Cancelled).

39. (Previously Presented) The invention of Claim 19 or 21 wherein the support structure comprises first and second flanges, and wherein the guide extends under the flanges to prevent excessive upward movement of the diaphragm with respect to the support structure.

40. (Previously Presented) The invention of Claim 19 or 21 wherein the leg assembly extends on both sides of the support structure such that the leg assembly extends laterally outwardly of all of the guide and laterally outwardly of all of the support structure.

41. (Previously Presented) The invention of Claim 19 or 21 wherein the leg assembly comprises two legs, each leg extending on a respective side of the support structure such that the legs extend laterally farther from a centerline aligned with the support structure than both the guide and the support structure.

42. (Previously Presented) The invention of Claim 19 or 21 wherein the leg assembly comprises two legs arranged such that all of the support structure and the guide are disposed between the legs.

43. (Previously Presented) The invention of Claim 19 or 21 wherein at least a forward portion of the crash cushion is freestanding.

44. (Previously Presented) The invention of Claim 19 or 21 further comprising an additional diaphragm and an additional energy absorbing element disposed between the additional diaphragm and the first-mentioned diaphragm.

45. (Previously Presented) The invention of Claim 44 further comprising a fender panel extending alongside the additional diaphragm and the first-mentioned diaphragm.

46. (Previously Presented) The invention of Claim 44 further comprising an additional guide coupled to the additional diaphragm, wherein the additional guide is mounted to slide along

the support structure and to restrict movement of the additional diaphragm with respect to the support structure in at least one lateral direction.

47. (Previously Presented) The invention of Claim 46 wherein the additional guide is mounted to restrict movement of the additional diaphragm with respect to the support structure in both lateral directions.

48. (Previously Presented) The invention of Claim 44 wherein the sport structure is anchored to the support surface between the additional diaphragm and the first-mentioned diaphragm.

49. (Previously Presented) The invention of Claim 19 or 21 further comprising an additional diaphragm and an additional energy absorbing element disposed between the additional diaphragm and the first-mentioned diaphragm, wherein the additional diaphragm is coupled to an additional leg assembly extending beneath the additional diaphragm on at least one side outboard of the support structure to support the additional diaphragm on the support surface.

50. (Previously Presented) The invention of Claim 19 or 21 further comprising an additional diaphragm and an additional energy absorbing element disposed between the additional diaphragm and the first-mentioned diaphragm, wherein the additional diaphragm is coupled to an additional leg assembly extending beneath the additional diaphragm on both sides outboard of the support structure to support the additional diaphragm on the support surface.

51. (Previously Presented) The invention of Claim 19 or 21 further comprising:

an additional diaphragm;

an additional energy absorbing element disposed between the additional diaphragm and the first-mentioned diaphragm;

an additional leg assembly, the additional leg assembly and the first-mentioned leg assembly each comprising an upper portion mounted to a respective one of the additional diaphragm and the first-mentioned diaphragm a lower portion two side portions and a centerline extending between the side portions;

each said lower portion connected to two feet shoed to support the respective leg assembly on the support surface;

the feet extending outwards from the respective leg assembly, away from the centerline such that the feet are separated from the respective centerline by a maximum distance D_F , the side portions are separated from the respective centerline by a maximum distance D_L , and the ratio D_F / D_L is greater than 1.1.

52. (Previously Presented) The invention of Claim 51 wherein the ratio D_F / D_L is greater than 1.4.

53. (Previously Presented) The invention of Claim 51 wherein the ratio D_F / D_L is greater than 1.8.

54. (Previously Presented) The invention of Claim 51 wherein each foot angles downwardly and outwardly from the respective leg assembly.

55. (Previously Presented) The invention of Claim 51 wherein each foot comprises a side plate adjacent a lower portion of the respective foot each side plate extending outwardly and downwardly from the respective foot to create a ramp extending transversely to the respective one of the additional diaphragm and the first-mentioned diaphragm.

56. (Previously Presented) The invention of Claim 51 wherein the first-mentioned leg assembly comprises the guide and wherein the additional leg assembly comprises an additional guide, the guide and additional guide each centered on the centerline and comprising a first pair of spaced plates facing the centerline on one side of the centerline and a second pair of spaced plates facing the centerline on the other side of the centerline.

57. (Previously Presented) The invention of Claim 19 or 21 further comprising:
an additional diaphragm.

an additional energy absorbing element disposed between the additional diaphragm and the first-mentioned diaphragm,

an additional leg assembly, the additional leg assembly and the first-mentioned leg assembly each comprising an upper portion mounted to a respective one of the additional diaphragm and the first-mentioned diaphragm, a lower portion, two side portions and a centerline extending) between the side portions,

each said lower portion connected to two feet shaped to support the respective leg assembly on the support surface,

the feet extending outwardly from the respective leg assembly, away from the centerline, such that the feet are separated from the respective centerline by a maximum distance D_F the side portions are separated from the respective centerline by a maximum distance D_L , and the difference $D_F - D_L$ is greater than 4 cm.

58. (Previously Presented) The invention of Claim 57 wherein the difference $D_F - D_L$ is greater than 8 cm.

59. (Previously Presented) The invention of Claim 57 wherein the difference $D_F - D_L$ is greater than 12 cm.

60. (Previously Presented) The invention of Claim 57 wherein each foot angles downwardly and outwardly from the respective leg assembly.

61. (Previously Presented) The invention of Claim 57 wherein each foot comprises a side plate adjacent a lower portion of the respective foot each side plate extending outwardly and downwardly from the respective foot to create a ramp extending transversely to the respective one of the additional diaphragm and the first-mentioned diaphragm.

62. (Previously Presented) The invention of Claim 57 wherein the first-mentioned leg assembly comprises the guide and wherein the additional leg assembly comprises an additional guide, the guide and additional guide each centered on the centerline and

comprising a first pair of spaced plates facing the centerline on one side of the centerline and a second pair of spaced plates facing the centerline on the other side of the centerline.

63. (Previously Presented) The invention of Claim 19 or 21 wherein the support structure comprises at least three axially aligned, releasably interconnected support structure segments wherein the support structure is anchored to the support surface near a first end of the support structure, near a second end of the support structure, and intermediate the first and second ends of the support structure.

Claims 64-66 (Cancelled).

67. (Previously Presented) The invention of Claim 19 or 21 further comprising an additional element the energy absorbing element being disposed between the diaphragm and the additional element.

68. (Previously Presented) The invention of Claim 67 further comprising a fender panel extending alongside the diaphragm and the additional element.

Claims 69 and 70 (Cancelled).

71. (Previously Presented) The invention of Claim 19 or 21 wherein the rail assembly comprises first and second laterally separated elements positioned to restrict upward movement of the guide said elements extending long an axial direction defined by the rail assembly.

72. (Previously Presented) The invention of Claim 71 wherein the guide comprises first and second guide elements positioned below the first and second rail assembly elements, respectively.

73. (Previously Presented) The invention of Claim 71 wherein the first and second rail assembly elements comprise respective downwardly-facing surfaces.

74. (Previously Presented) The invention of Claim 71 wherein the first and second elements comprise respective horizontally-extending flanges.